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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,094	09/09/2003	Takao Kamoshima	67161-098	9847
7590 03/11/2004 McDermott, Will & Emery 600 13 th Steet, N.W. Washington, DC 20005-3096			EXAMINER NGUYEN, DILINH P	
			ART UNIT 2814	PAPER NUMBER

DATE MAILED: 03/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/657,094

Applicant(s)

KAMOSHIMA ET AL.

Examiner

DiLinh Nguyen

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/9/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

Claims 8-11 are objected to because of the following informalities:

In lines 5-6 of claim 8, the limitations "a large line width... a small line width" should be changed to --the large line width and the small line width--.

In lines 7-8 of claim 9, the limitations "a large line width... a small line width" should be changed to --the large line width and the small line width--.

In line 3 of claim 10, the limitation "a large line width" should be changed to --the large line width--.

In line 3 of claim 11, the limitation "a small line width" should be changed to --the small line width--.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. (U.S. Pat. 6040243).

Li et al. disclose a semiconductor device (cover fig.) comprising:

a first conductive layer 68 formed on a substrate 60 and composed of a copper layer;

an insulating layer 76 formed on the first conductive layer and having a hole reached the first conductive layer;

a second conductive layer 100 formed within the insulating layer and composed of a copper layer electrically connected to the first conductive layer through the hole; and

a barrier metal layer 92 formed between the second conductive layer and the hole, and the insulating layer; wherein

the barrier metal layer has an opening in a bottom portion of the hole, and the second conductive layer comes in direct contact with the first conductive layer through the opening.

3. Claims 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Moslehi (U.S. Pat. 6124198).

- Regarding claims 5-7, Moslehi discloses a semiconductor device (fig. 3) comprising:

a first conductive layer (N-1) formed on a substrate and composed of a copper layer (column 2, lines 25-30);

an insulating layer formed on the first conductive layer and having a first hole and a second hole reached the first conductive layer; and

a second conductive layer 34 for electrical connection to another element, electrically connected to the first conductive layer through the first hole and formed within the insulating layer;

the second hole electrically connect the first conductive layer; wherein

Moslehi discloses a plurality of metallic columns made of stacked dummy contact and via plugs may be used to provide additional mechanical support (column 14, lines 8-12).

- Regarding claim 8, Moslehi discloses the first conductive layer (N-1) has a first interconnection portion with a large line width (N-1 on the right hand side) and the second conductive layer has a second interconnection portion with a small line width, and the first interconnection portion with the larger line width is connected to the second interconnection portion with the small line width through the hole.
- Regarding claim 9, Moslehi discloses a semiconductor device (fig. 3) comprising: the first conductive layer (N-1) has a first interconnection portion with a large line width (right hand side), and a second interconnection portion with a small line width (left hand side), a second conductive layer has a third interconnection portion with a small line width, and the second interconnection portion with the small line width is connected to the third interconnection portion with the small line width through the hole.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sachiko (JP. 2001345325) in view of Li et al. (U.S. Pat. 6040243).

Sachiko discloses a semiconductor device comprising:

a first interconnection portion formed on a substrate 1;

a second interconnection portion formed on the substrate and having a line width larger than that of the first interconnection portion;

the first interconnection portion is composed of a copper layer formed by plating (abstract); and

the second interconnection portion has two layered structure of a copper layer 7a and a metal layer 7b.

Sachiko fails to disclose an insulating layer formed on the interconnection portions.

Li et al. disclose a semiconductor device (cover fig.) comprising:

an interconnection portion 68 formed on a substrate 60;

an insulating layer 76 formed on the interconnection portion and having a hole reaching the interconnection portion; and

a conductive layer 100 electrically connected to the interconnection portion through the hole and formed within the insulating layer. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Sachiko to provide a good electrical connection property and to prevent the copper contamination of the insulating layer, as shown by Li et al.

- Regarding claim 3, Sachiko discloses the metal layer 7b is a copper layer and it would have been obvious to form by sputtering.

Additionally, this is considered a product-by-process limitation. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

- Regarding claim 4, it would have been obvious to have the metal layer is an aluminum alloy layer.

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi (U.S. Pat. 6124198).

Moslehi discloses a plurality of metallic columns made of stacked dummy contact and via plugs may be used to provide additional mechanical support (column 14, lines 8-12) and it would have been obvious that the dummy hole is formed so as to reach the first interconnection portion with the large line width or the small line width.

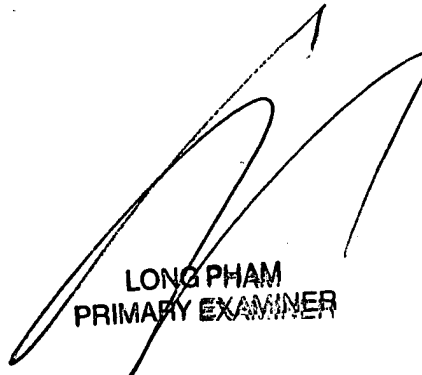
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN  
March 3, 2004



LONG PHAM  
PRIMARY EXAMINER